

The Engineering of Biology and Medicine

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In celebration of the 100th Anniversary of PNAS, this Special Feature summarizes the enormous progress that has been made in the engineering of biology and medicine. In 1915, PNAS published articles, such as “A comparison of methods for determining the respiratory exchange of man,” by T. M. Carpenter (1), “The lymphocyte as a factor in natural and induced resistance to transplanted cancer,” by J. B. Murphy and J. J. Morton (2), and “Mechanism of protection against bacterial infection,” by C. G. Bull (3). It is fascinating to look back at these early studies and see how much progress has been made in the engineering of biology and medicine. Biology and medicine have been transformed from

descriptive science and art to quantitative, mechanistic understandings of function, primarily because of the elucidation of biology at the molecular level. These advancements have led to the creation of new drugs, vaccines, devices, diagnostics, and imaging agents that significantly contribute to life saving and life extension. In this Special Feature, a variety of topics are presented to highlight the current state of the art and possible future scenarios

for the engineering of biology and medicine. We thank PNAS for publishing together these state-of-the art reviews, as we feel that this Special Feature will provide a useful reference for those in field—as well as those out of field—who are seeking to understand where the engineering of biology and medicine is likely to be in the future.

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1 Carpenter TM (1915) A comparison of methods for determining the respiratory exchange of man. *Proc Natl Acad Sci USA* 1(12):602–605.

2 Murphy JB, Morton JJ (1915) The lymphocyte as a factor in natural and induced resistance to transplanted cancer. *Proc Natl Acad Sci USA* 1(4): 435–437.

3 Bull CG (1915) Mechanism of protection against bacterial infection. *Proc Natl Acad Sci USA* 1(11):545–546.